COTTON CHATS

FROM

DRAPER COMPANY

SHIPMAN'S
COMMON-SENSE BINDER

PATENTED

JANUARY 19, 1892. APRIL 19, 1904

To open binder, remove the slides from fasteners raise the fasteners to an erect position and then file papers. For punching: lay the papers on covers and mark sheets to correspond with fasteners.

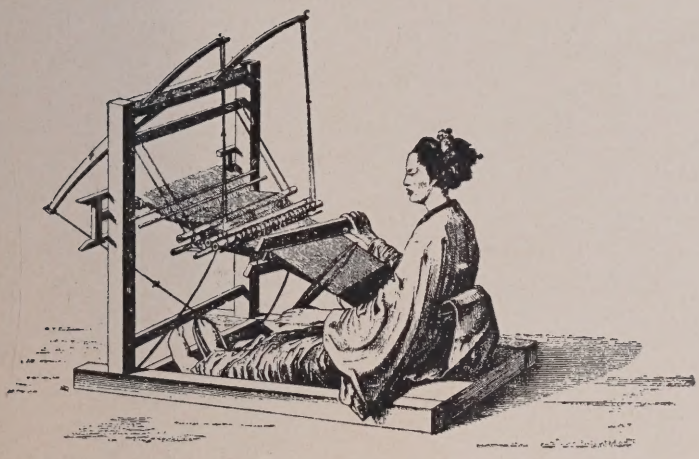
If DUPLICATE is wanted ORDER 25981

ASA L. SHIPMAN'S SONS
MANUFACTURERS,
NEW YORK.

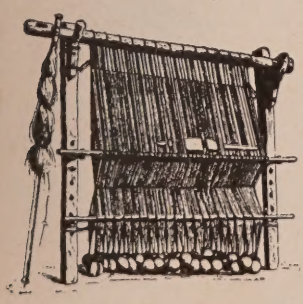
COTTON CHATS

By the secretary of the
DRAPER COMPANY,
HOPEDALE, MASS.

No. 23. JANUARY, 1904.

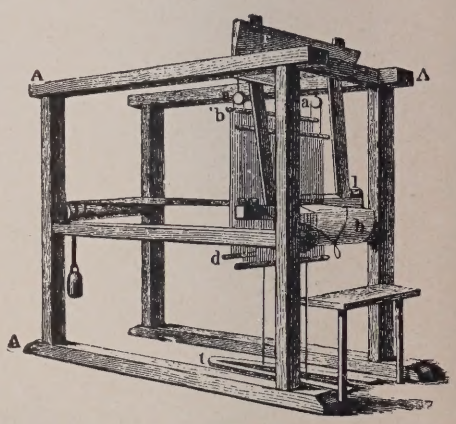


The process of weaving cloth consists in interlacing a continuous thread amidst a series of parallel threads. Without giving an exhaustive history of the art it may be pertinent for further comparison to note down certain steps in its progress. It is fairly well established to-day that woven goods were used as clothing by the ancient Egyptians fully 6,000 years ago. I have seen in Switzerland a preserved section of a net woven of twisted threads supposed to have been the work of the Lake dwellers in pre-historic times. In the earlier processes it is probable that the warp threads were stretched on pegs, the weft being inserted by the fingers. In such weaving the warp threads usually lie vertically and in fact this is the method used to-



day in producing rugs in the Orient with short wefts. With the use of longer weft also came the use of a stick with a hooked end for pulling it into position. If we are to form our further comparisons on a plain print cloth of the present width of 28 inches containing 64 threads of warp and 64 of filling per inch it is possible that the rate of weaving by this method on such goods could be figured as low as one pick

per minute per operative in the earliest use. Cloth is still woven by this method in India, although a harness motion is added. History gives us no record of the time at which the warp threads were divided by harnesses and the shuttle introduced. References are made to shuttles in the Bible and other ancient books. It is probable that the general styles of hand loom weaving were very similar for many centuries without definite change until the invention of the fly shuttle by John Kay in 1733. At this time, in weaving broad cloth, it was necessary to have two weavers at least, one at each end of the lay to throw the shuttle to the other. By Kay's invention one of these two men was dispensed with and even on narrow weaving a weaver could produce at least twice as much cloth per day. No literature that I have run across gives any figures of production on the looms of this period and considering their crudeness in other lines, it is perhaps fair to assume that they could not produce at a greater speed than 20 picks per minute before Kay's time, probably averaging less. Kay's invention caused great commotion amongst the weaving trade and he was forced by persecution to leave the country. Cartwright's power loom patent was granted in 1785. Authorities differ as to the success of his first looms, some claiming that the early use was of no importance, while others refer to a mill of 500 looms in which Cartwright was interested, as being destroyed in 1790 by a mob in sympathy with the hand loom weavers. Whatever the cause, there were as late as 1813 but 2400 power looms in all Great Britain. The first power loom was introduced in Waltham in America in 1815. At this period one operative was required to each loom, as they had no weft stop motion and no self acting temples, the weaver having to intermittently move the flat wooden pieces with points at the end which held the cloth extended at the selvage. The invention of the rotary temple by Ira Draper in 1816, as developed several years



later, allowed the operative to tend two looms instead of one. The speed of the common power loom at this time does not seem to be recorded, but it was probably between 80 and 100 picks per minute. In 1820 it is figured that there were about 15,000 power looms in England and Scotland and in 1830 perhaps 60,000. In 1833 there were 100,000, but even as late as 1840 there were said to be 250,000 hand looms still running. At this time weavers in England were not given more than one loom each, although in America they were running two looms, as the English manufacturers did not adopt the rotary temple so early as our American manufacturers. As to the comparative production of the common looms at this period, it is difficult to find any accurate basis of comparison. Hand looms were weaving print cloth as late as 1896 in Bohemia, where the production figured on 64 picks per inch in the cloth at ten hours per day would give an average of 35 picks per minute. I have been given figures of hand loom production recently that would suggest a possible speed of 60 picks per minute. About 1840 the weft fork began to be introduced and in America by 1850 print looms were running at a speed of 150 picks per minute, with one operative tending four looms. Perhaps they ran even faster in England, but the operatives only tended two looms. From this period to 1895 the plain loom was not materially changed in principle, and yet the perfection of detail had brought the speed of the American plain loom up to 190 picks with one good weaver tending eight looms, while the English operative with looms at a speed of 220 picks per minute was tending four looms, though usually with a helper. In 1895 the Northrop looms then introduced immediately allowed one weaver to run 16 print looms at 190 picks and today it is assumed that a good weaver with the Northrop loom on prints can easily tend 24. In calling the speed of the American print loom 190 picks it is not intended to give a maximum. American print looms have run over 200 picks, but such is not the general practice. In the same way English looms have run higher than 220 picks, but the figures given are assumed as fair for the purposes of comparison and as illustrating the general practice. It is my purpose next month to draw some interesting conclusions from these figures.

• • •

HONOR TO WHOM HONOR IS DUE.

It is really gratifying to correct a personal error when the correction establishes the rights of neglected inventors. In Cotton Chats for December, I referred to the earliest invention in the line of changing shuttles, as claimed for Charles Parker, but possibly belonging to Clinton G. Gilroy. As I noted, the shuttle changing idea of Gilroy, as outlined in his work on weaving, was not apparently taken from the Parker patent. We had the state of the art on shuttle-changing devices investigated at great length some fourteen years ago, and other investigations have since been made by other parties. In all these years, Parker has been held to be the first inventor in this line, probably because the official British publication of *Abridgements of the Specifications relating to Weaving* places Parker at the top of the list of patents for apparatus for changing shuttles. Mr. Arthur S. Browne, patent expert, in noting my article in Cotton Chats, has since called my attention to the patent of John Patterson Reid and Thomas Johnson, No. 6579, dated March 20, 1834. It is from this patent that Gilroy devised the loom of Arphaxad without question; for Gilroy was a careful student of patents, and the Reid & Johnson loom contains all of the elements referred to in Gilroy's satire. It contemplates the weaving of four webs of cloth at once, in the same vertical power loom. It has a mechanism designed to change the shuttles when any one weft thread breaks, or fails, the substitution occurring by an instantaneous movement, without any act of the attendant, and without stopping the loom, the mechanism being brought into action by a weft stopper annexed to the shuttle. The specification also refers to changing shuttle boxes to bring different colored weft into action. It also contains a jacquard mechanism.

Both Reid and Johnson were prolific inventors, Johnson having taken out a patent as early as 1803, for a dressing machine, and Reid as early as 1827, for a lay motion. Johnson and Reid together took out several other patents for less interesting improvements.

• • •